REMARKS

Amendments

No new matter is added by the present amendments. Prior to the amendment set forth above, Claims 1-45 were pending, including nine independent Claims 1, 7, 10, 14, 31, 33, 37, 41 and 43. After entry of the amendment above, Claims 1-48 are pending, including seven independent Claims 8-11 and 46-48.

Claims 9 and 11, deemed allowable, have been placed in independent form. Independent Claims 7, 14, 33, 37 and 43 have been made dependent on Claims 1, 2, 31, 46, and 41, respectively. Previously independent Claims 1 & 37, 31, and 41, have been made dependent on new independent Claims 46-48, respectively. The new independent Claims 46-48 are fully supported by the parent application 09/632,081, filed 08/02/2000, entitled "Adaptive Antenna Method and Apparatus", which is now U.S. Patent 6,952,455 issued October 4, 2005. The first sentence of the specification is amended herein to reflect the issuance of the patent. Claims 46-48 recite a method as illustrated, for example, in Figures 4 and 5 and described in the associated text (page 13 line 14 to page 14 line 19) of the subject application. This subject matter is also present in the parent application (patent 6,952,455). All other amendments are supported by the claims as originally filed, primarily returning the claims to their original form. Previous amendments to enhance clarity have been retained, and some language has been slightly refined for clarity and/or conciseness.

Rejections under 35 USC 102 over Harrison

The previous amendment in respect of the subject application, which was mailed February 14, 2006, amended the rejected independent claims by incorporating reference to the use of perturbation vectors as taught by the parent application. The Examiner apparently was not persuaded that the added material defined the use of perturbation vectors sufficiently to distinguish Harrison. Instead, the Examiner points to channel estimator 204 and weight estimator 602 of Harrison as disclosing perturbation vectors.

It is respectfully submitted that weight estimator 602 of Harrison is not relevant to the process of selecting a new weight vector for transmission. Instead, the weight estimator 602 serves only for the receiver to estimate the weight vector that has been applied by the transmitter. The weight applied by the transmitter may be determined either by the transmitter (based on channel estimates made by the receiver), or by the receiver (based on its own channel estimates). Even when the weight vectors are suggested by the receiver, Harrison expresses concern that reception may suffer if the transmitter uses weights unexpected by the receiver (see Harrison, col. 8 line 65-col. 9 line 32, particularly col. 9 lines 12-17). As may be seen in Fig. 6 of Harrison, output from the weight estimator 602 goes only to the pilot synthesizer 208, not to the weight computer 210 (similarly in Fig. 9, the only output from weight estimator 602 goes to pilot synthesizer 208).

Thus, the weight estimator 602 is relevant only to receiver pilot synthesis, and is not relevant to, *e.g.*, Claim 1 as previously pending, which recited in part (underlining added for emphasis): "selecting a perturbation vector that determines, at the transmitter, time-alternating perturbations to the weight vector." The Examiner's rationale in support of the contention that Harrison discloses perturbation vectors is thus flawed for at least that reason. Even were estimator 602 relevant, however, the identified portions of Harrison would not comport with perturbation vectors as that term is used in the Applicant's specification.

Nonetheless, the Examiner appears disinclined to credit the previously-added requirement of perturbation vectors as distinguishing Harrison. Therefore, the requirement for perturbation vectors is extended and clarified in the new independent Claims 46-48. New Claims 46-48 more thoroughly define the meaning and use of perturbation vectors, to ensure that Harrison clearly fails to suggest such requirements. Each of new Claims 46-48 includes generally similar limitations, albeit with language tailored for different types of claims and thus subject to differing interpretations. The Examiner will readily see that the remarks set forth below with respect to Claim 46 are applicable, *mutatis mutandis*, to Claims 47 and 48.

New Claim 46 recites in part (underlining added for emphasis):

> a) selecting different first and second perturbation vectors, wherein a perturbation vector is a vector that temporarily modifies a previously determined transmitter antennae weight vector to create a test weight vector; and
> b) determining a new transmitter antennae weight vector based at least in part on feedback from the receiver that reflects a comparison between receptions of different signal sets, including
>
> > i) a first signal set transmitted during one or more first time periods that is a source signal as weighted by a first test weight vector based on an old transmitter antennae weight vector as perturbed according to the first perturbation vector, and
> > ii) a second signal set transmitted during one or more second time periods that is substantially the same source signal as weighted by a second test weight vector based on the old transmitter antennae weight vector as perturbed according to a different second perturbation vector.

Harrison teaches calculating new weight vectors based on the forward channel estimate developed by the receiver. The receiver may either determine the weight vectors itself, or may return the channel estimates so the transmitter to determine the weight vectors. A channel estimate is based on a comparison of a received signal with the signal that is believed to have been sent, not on a comparison between receptions of different received signal sets. This contrasts with the approach recited in Claim 46.

The closest mapping of the requirements of Claim 46 to the features described in Harrison will be if first (V1), second (V2) and third (V3) weight vectors, sequentially developed in accordance with the teaching of Harrison, are deemed to correspond to "the old weight vector," "the first test weight vector," and "the

second test weight vector," respectively. With such mapping, the first "perturbation vector" must be a vector that accounts for the change from the first weight vector to the second weight vector, while a second "perturbation vector" must be a vector that accounts for the change from the first weight vector ("the old weight vector") to the third weight vector. Such "perturbation vectors" could, in theory, be calculated from the information available to the system of Harrison.

However, Harrison does not select such perturbation vectors, as required by Claim 46, and would not benefit from either selecting or determining such vectors. While comparable vectors certainly could be determined, for example by taking V3-V1 or V2-V1, such calculations are not mentioned in Harrison as being performed, let alone required. A skilled person would avoid performing totally unnecessary computations to determine such perturbation vectors. Conversely, the requirement of selecting perturbation vectors, as required in, for example, Claim 46, serves an important purpose for adaptive weight selection as taught in the Applicant's specification. Indeed, a great deal of the subject matter that is new in the subject application (as compared to the parent application) regards improved methods for selecting perturbation vectors.

Furthermore, Harrison does not suggest how one might base new weight vectors on comparison between reception of first and second signal sets, where the signal sets are derived from the same signal source but differently perturbed. Harrison does mention that transmitter control data might be a channel error rate (col. 6 lines 55-60), but no relevant details are provided, and no successful implementation of such technique can reasonably be deduced from Harrison with the ordinary knowledge of one skilled in the art (*i.e.*, any such technique is not enabled by Harrison). Moreover, a varying channel error rate certainly does not suggest or imply a limitation to comparing signals that are based on a same signal source, but are differently weighted.

The preceding two paragraphs provide specific examples by which Harrison fails to anticipate new Claim 46 with reference only to element (b). However, Harrison also fails to disclose any vector that can reasonably be said to satisfy the requirements set forth in element (a) of new Claim 46.

Moreover, the foregoing examples consider only subsets of the features required by Claim 46. It is respectfully submitted to be even more clear that Harrison fails to "read on" Claim 46 when the features required by Claim 46 are taken together with the cooperation required therebetween. A demonstration of such failure is unneeded in view of the missing elements, and would be tedious in view of the differences in terminology between Harrison and (*e.g.*) Claim 46, and accordingly will not be undertaken unless necessary.

Application of the remarks set forth above to Claims 47 and 48 is straightforward, and supports a conclusion that Harrison fails to anticipate any of these new claims. All other claims that stand rejected are unanticipated by Harrison at least by virtue of depending from one of these new claims.

Rejections under 35 USC 103 over Harrison in view of Oler

The Examiner rejects Claims 7, 14-15, 33, 36, 43 and 45, as previously pending, as obvious over Harrison in view of Oler. Oler is cited for a particular feature, namely "reverse channel autocorrelation matrix estimate." The Examiner has not cited Oler for disclosure of features in any presently pending independent claim, nor is Oler seen to have relevant disclosure that could reasonably be combined with Harrison to render obvious any of the presently pending independent claims. It is respectfully submitted that Oler fails to remedy the omissions of Harrison that are described above in the remarks in respect of elements (b) and (a) of Claim 46. As such, Oler and Harrison, combined, do not support *prima facie* obviousness of any of the independent claims, as presently pending. Therefore, the issue of whether combining Oler with Harrison is possible or properly motivated is cumulative, and hence is not presently addressed, but instead is reserved for future argument as may be needed. Each presently pending claim has either been deemed allowable by the Examiner over Harrison in view of Oler, or is nonobvious over Harrison in view of Oler at least by virtue of depending from an independent claim that has been demonstrated, in remarks set forth above, to be nonobvious over Harrison in view of Oler.

Conclusion

It is respectfully submitted that the remarks set forth above demonstrate that each and every claim, as presently pending, overcomes each grounds of rejection set forth by the Examiner. As such, the Examiner is respectfully requested to reconsider the application, and, barring the discovery of new grounds for rejection, to promptly issue a Notice of Allowance of all claims.

The Commissioner is authorized to construe this paper as including a petition to extend the period for response by the number of months necessary to make this paper timely filed. Fees or deficiencies required to cause the response to be complete and timely filed may be charged, and any overpayments should be credited, to our Deposit Account No. **50-0490**.

Respectfully submitted,

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